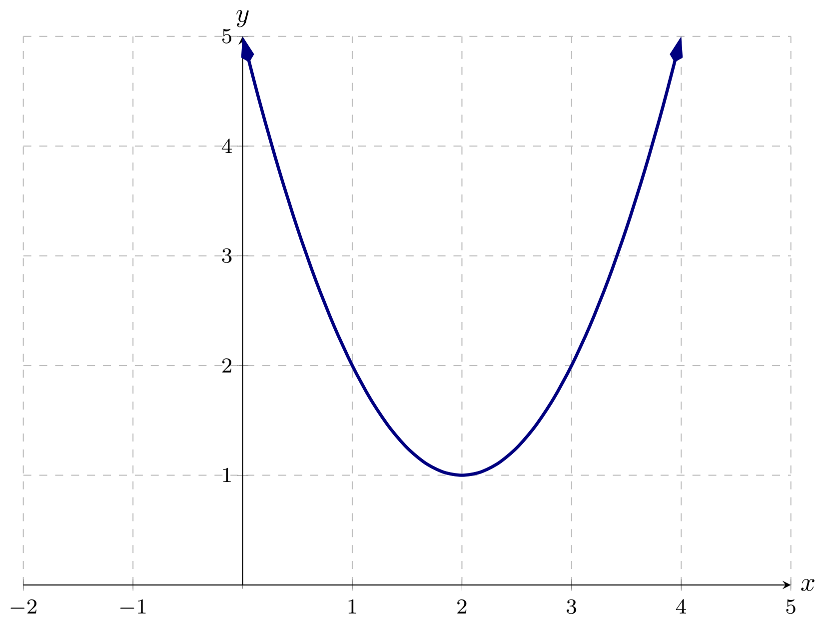
Exercise 1 *The function given by* $f(x) = 3(x-2)^2 + 1$ *(graphed below) is not a one-to-one function on* $(-\infty, \infty)$*. If we restrict the domain, however, it can be made to be one-to-one.*



Find a formula for $f^{-1}(x)$ *when* f *is restricted to* $(-\infty, 2]$*.*

$$f^{-1}(x) = \boxed{2 - \sqrt{\frac{x-1}{3}}}$$

Hint: *We're starting with* $y = f(x)$*, so that's:*

$$y = \boxed{3(x-2)^2 + 1}$$

Swap x *and* y*.*

$$x = \boxed{3(y-2)^2 + 1}$$

Solving for y *you find two solutions. They are:*

$$y = 2 - \sqrt{\boxed{\frac{x-1}{3}}}$$

$$y = 2 + \sqrt{\boxed{\frac{x-1}{3}}}$$

The domain of f was restricted to $(-\infty, 2]$, which means we want the range of f^{-1} to be $(-\infty, 2]$. Which of the two solutions you found give outputs which are not greater than 2?